

No. VIII. Began simultaneously in the Southwest, and advanced slowly in a direction almost due northwest over the Ohio Valley. It was attended by heavy precipitation and high winds, disappearing near Nova Scotia on the 20th.

No. IX. Commenced on the 21st, near the mouth of the Rio Grande River, and, skirting the Gulf coast, crossed over northern Florida on the night of the 22d, thence making its pathway along the main axis of the Gulf Stream.

No. X. Began in the Gulf, and on the night of the 24th passed over southern Florida and thence along the Atlantic sea-board. It reached the Nova Scotia coast on the 27th. This gale was followed by heavy snow-storms in New England, the snow falling two feet deep in some places.

No. XI.—Began in the extreme Northwest on the 25th, and, after pursuing a southeastward course to Lake Erie and New York, bore away in the direction of Nova Scotia.

No. XII. Is first seen on the morning of the 28th on Lake Superior, whence it coursed nearly due eastward along the Lake frontier, but with no very marked effects.

ANTI-CYCLONIC AREAS.

There were eight areas of decided high pressure, which traversed the country during the month. They originated mostly in the Northwest, and preserved a course nearly southeastward toward the south Atlantic states. The only noticeable feature in the anti-cyclonic areas is their variety, their smallness, and inferior barometric intensity, as compared with the very remarkable anti-cyclones of December, 1872.

TEMPERATURE.

There has been no deficiency of temperature in any section of the United States furnishing weather reports. On the contrary (except in the Gulf States, where it was normal), the thermometer has everywhere ranged from 1° 3 to 8° Fahrenheit above its usual December height. The greatest excess of warm weather has been in the upper and lower lake regions. The mean excess in all the sections (see Chart No. 3, Table of Temperatures) is nearly 4° for the month—an excess much more potential, in its climatic effect, than would appear from the figures.

PRECIPITATION.

The precipitation in the United States for December was decidedly in excess of the usual amount. In the lower lake region, the upper Mississippi valley, the Ohio and lower Missouri valleys, the excess is most palpable. Elsewhere, save in the Gulf and Middle States, the normal precipitation is reported. Chart No. 2 explains itself. The rainfall deficiency in the Southwest will not be felt, agriculturally, inasmuch as an excess of rain fell in November.

PECULIAR PHENOMENA AND FACTS.

The observer at Cape May reported on the 19th of December, "at 6 p. m., in the southwest, a flash of lightning, which had the appearance of the explosion of a ball or bomb;" also a great amount of "sheet-lightning." The observer at Pike's Peak, among other interesting observations, notes the peculiar effect of sunset in these words: "In the distance, to the northeast, a heavy mist was overhanging the plains. On this mist was depicted a perfect shadow and profile of our peak by means of the setting sun. The image is so realistic that one could hardly credit that it was merely a shadow, and not a lofty peak, rising abruptly from the prairie. This continued for the space of fifteen minutes, when it gradually melted away in the mist, as the sun was setting behind the gigantic peaks of the 'Snowy Range.'" At Cape Henry, during the night of December 21, the brig "Mary Rice," from Rio Janeiro bound to Baltimore, was wrecked within sight of the new Coast Signal Station. The observer, by promptly telegraphing to Norfolk, procured help, and the entire cargo was secured and the ship saved. At Lexington, Ky., a "lunar rainbow," with the prismatic colors, was seen on the night of the 1st. In the storm of the 4th, at Toledo, the river was nearly emptied of water by the wind, and buildings were damaged to the extent of \$75,000. Auroral displays have been rare during the month and very faint. A "mock sun" was observed at Saint Paul, Minn., on the 4th and a beautiful "parhelic circle" on the morning of the 29th. Much lightning and thunder were reported from the upper Mississippi valley, showing the presence of the great equatorial air-current.

The amount of fog which prevailed in the United States in December was very great, and is probably due to the fact that neither the great equatorial nor the broad polar current has been established over the country, but, rather, both currents brought into juxtaposition on its eastern side.

In the latter part of November, vast prairie fires occurred in the far West, and several *dust storms*, filling the air with fine and impalpable particles, which are known to remain suspended in the air for many days, and sometimes are finally precipitated with water, forming the celebrated "*black rain*."

The hail-storm at Nashville on the 18th was so sudden in its approach that none suspected it, and the streets were lined and thronged. The hail-stones were about the size of almonds, and generally very smooth and even in form, and covered the ground to a depth of an inch. The hail-storm originated with a smooth sheet of stratus cloud, supplanting a low-moving scud, and a sudden shift of wind from south to northwest.

THE RIVERS.

These will be seen in the table on the precipitation chart (No. 2), right side. It will be observed there was an extraordinary rise in the Mississippi, at Cairo, Memphis, and Vicksburg, from the 18th to the 30th of December. This was caused by the enormous floods in the Ohio and its tributaries from the 9th to the 18th ultimo, on which last-named day the Ohio was 44 feet and 2 inches above the low-water mark. It will be seen from the table that all the Western water courses have been full during the past month—a fact which gives promise for the next season's agricultural yield.

The excessive rains which found their way early in December to the upper Ohio, were probably due to the projection of the cold polar current in the rear of the great storm of December 3 and 4, already described. The cold current served to condense the vast floating reservoirs of vapor which the cyclone had drawn to its eastern side and front from the Gulf of Mexico.

CAUTIONARY SIGNALS.

During the month of December there were hoisted at American ports sixty-three cautionary signals, and for Canadian ports thirty-four storm premonitions were telegraphed.

The display of cautionary signals on the Lakes was suspended after the 10th of December, by which time navigation was entirely closed.

Out of the whole number of storm-warnings displayed at all American ports, four are doubtfully justified, but the number known to have been *actually justified* is forty-seven, which gives as the percentage of verification 73.43. The office has no returns to show how many were verified at the Canadian ports.

The display of these signals at the various ports was generally respected, and the confidence in their accuracy may be seen by the reports of their reception, of which a few specimens may be given: Thus, at Alpena, Mich., when on the 1st a storm-signal was displayed, "steamers in port delayed going out till morning of the 2d." At Boston, Mass., December 26, after signal was displayed, "all shipping remained in port." At New Haven, December 23, "the warning attracted considerable attention in the city, owing to the subsequent snow." At Wilmington, N. C., December 26, "the signal was generally heeded by mariners and those engaged in shipping-business." Similar reports frequently come from Chicago and other sea-ports.

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